

Relationship between Farm Size and Reforestation Activity: Evidence from Queensland Studies

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This paper reviews the findings of nine studies carried out over about the last decade by a forestry socio-economic research group in Queensland, Australia. On the basis of survey evidence and landholder typology research, the questions of who plants trees and for what reasons are addressed, and inferences are drawn about the impact of land fragmentation on farm forestry. It is concluded that forestry is less popular on the larger and commercially viable farms than on smaller holdings of similar land type, and plantation establishment is often supported by off-farm income, so that farm fragmentation may actually lead to increased tree planting. However, whether this would lead to increased timber production is less clear, because of the strong interest of people on small holdings in environmental plantings and because of difficulties in marketing small quantities of the variable quality timber from mixed-species plantings. Also, the quality of silviculture appears to be positively correlated with area planted. Some implications are drawn for land-use policy.

Keywords: rainforest cabinet timbers, joint venture plantings, environmental benefits, landholder typologies, parcelisation and fragmentation

INTRODUCTION

Research suggests that fragmentation and parcelisation of forestry land may lead to reduced timber production and a decline in quality of stand management (e.g. Creighton *et al.* 2004). One way of testing this hypothesis is to examine the relationship between forestry attitudes and practices, other land-use activities, incomes and other factors in relation to the size of landholdings.

The farm size distribution in Queensland, Australia, is in a dynamic state. In some areas, farms are amalgamating as additional property is purchased (known locally as expansion blocks) or leased in order to obtain economies of scale in production, though this appears to be a slow process. In other areas, the pressure of urban expansion and the permissive attitude of local governments are leading to subdivision. Both processes take place in areas near the east coast, with favourable

rainfall (1200 mm/year or more) and moderate quality soils, suitable for forestry. These changes are likely to result in changes in the extent and nature of tree planting in the regions in greatest flux. The last decade has seen strong landholder interest in growing trees, particularly the native rainforest cabinetwood species with high timber value as well as some eucalypt species. In some cases, these plantings are part of the activities of Landcare groups¹, and nurseries operated by these groups have been a source of relatively low-cost seedlings. Little government financial assistance has been available for tree planting in most cases.

There has been strong interest in farm forestry in the Wet Tropics of north Queensland in recent years, perhaps stimulated by the heated controversy over World Heritage listing of the Wet Tropics rainforests in 1988 and supported by success of pioneers in demonstrating that rainforest species can be grown in plantations. At times, impressively high prices have been obtained for rainforest timbers at auctions, although this is not a reliable indicator of market prospects because the high prices are generally associated with very small quantities of timber, purchased by specialist users. Some (generally misguided) predictions of spectacular profitability of growing cabinetwoods no doubt also spurred interest.

In recent years, a number of studies have been undertaken of landholder attitudes and practices in farm forestry. Most of these studies have been conducted by the forestry socio-economic group established as part of the Rainforest Cooperative Research Centre². Rainforest CRC funding has been supplemented by funding from the Rural Industries Research and Development Corporation (RIRDC) and the North Queensland Afforestation Board. This paper reports observations on the relationship between tree planting and farm size from nine of these studies, as listed in Table 1. The following section reviews findings from each of these studies. Inferences are then drawn about implications of sub-division on tree planting activity and timber production.

EVIDENCE OF RELATIONSHIP BETWEEN FARM SIZE AND PLANTATION ESTABLISHMENT FROM QUEENSLAND STUDIES

The South and North Queensland Landholder Surveys of Forestry Activities and Attitudes

Exploratory surveys were conducted on landholder forestry activities, attitudes to tree planting, reforestation impediments and other issues, in both south and north Queensland.

¹ These are groups of farm and non-farm landholders in rural areas carrying out tree planting and other environmental measures under the well-established and government supported Australian Landcare movement.

² The Rainforest CRC is a federally-funded research initiative which includes researchers from The University of Queensland and Griffith University (Brisbane), James Cook University (Townsville and Cairns), the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Department of Primary Industries, and the Wet Tropics Management Authority.

Table 1. Selected Queensland farm forestry studies

Year of study	Location	Research method	References
1994	Obi Obi Valley	Postal survey	Harrison <i>et al.</i> (1994)
1996	North Qld.	Personal interviews with mayors	Eono and Harrison (1997)
1998	North Qld.	Postal survey in three local government areas	Herbohn <i>et al.</i> (1998) Harrison <i>et al.</i> (1998) Herbohn <i>et al.</i> (2005)
1999	North Qld.	Hierarchical cluster analysis of postal survey data; focus group meeting with forestry extension officers	Emtage <i>et al.</i> (2001) Herbohn <i>et al.</i> 2005
1999	South-east Qld.	Survey of applicants for plantation joint ventures	Harrison <i>et al.</i> (1999)
2001	North Qld. CRRP participants	Personal interviews of CRRP participants in two LGAs	Harrison <i>et al.</i> (2004)
2002	North Qld.	Focus group of land management specialists	Jeffreys (in process)
2003	North Queensland	Neural Network Analysis of postal survey data of Herbohn <i>et al.</i> 2005	Herbohn <i>et al.</i> 2003
2003-04	RIRDC case studies in eastern Qld.	Personal interviews with open ended questions and site inspections	Maczkowiack <i>et al.</i> (2004)

The Obi Obi Valley study

The Obi Obi Creek runs through farming land in the Sunshine Coast hinterland of south-east Queensland, within the Caloundra City local government area. The elevated high-rainfall area with basaltic soils is well suited to forestry. Much of the original vegetation was rainforest, which was cleared for timber and to establish pastures for dairying. The area is popular for its cool and pleasant climate (apart from the summer wet season), and the dairy industry has contracted, with much subdivision taking place, and many properties are operated as hobby farms and rural retreats. A postal survey of properties with areas of over 0.5 ha yielded 164 responses, approximately one third of the target population. There was probably some degree of response bias in favour of owners of small properties, with a high interest in tree planting.

Only about 14% of the respondents regarded themselves as farmers, and 89% derived less than half of their income from the property. Thirty six percent had planted trees, though only 18% had planted more than 1 ha. Plantings were mainly of native rainforest cabinet species, and 78% had planted a mixture of four or more species. About 65% had planted on land of moderate to steep slope, and 86% on land they considered to be of fair or low quality. There was a clear relationship

between proportion planting and property size: 0-5 ha 46%; 5-10 ha 30%; 10-40 ha 42%; over 40 ha 18%.

One area where considerable planting took place was the Montville Range, which has spectacular views of the coast and high subdivision pressure, and where at least some respondents had professional jobs in nearby coastal cities.

North Queensland farm forestry survey

A postal survey was conducted of north Queensland landholders in the Atherton and Eacham shires on the Atherton Tablelands and the Johnstone shire on the wet humid coast (reported by Herbohn *et al.* 2005). The ratepayer databases were used as the sampling frame, but with the restriction of a minimum property size of 10 ha (large enough for commercial tree planting) and only including properties classified as rural landholdings (as opposed to commercial, rural residential and urban categories). A total of 500 landholders were selected using proportional random sampling stratified by shire, 193 usable responses being obtained.

This survey generated a large amount of information about forestry practices and attitudes. The three shires differed significantly ($p < 0.05$) in the proportion of income sourced from non-farm income (only 13% of income in the Johnstone shire compared with 44% and 58% in the Atherton and Eacham shires, respectively). Due to climate and location of markets and processing facilities, the highly profitable activities of sugar cane and banana production are concentrated in the coastal Johnstone Shire.

Reasons for tree planting in the south and north Queensland studies

The two landholder surveys provide insights into reasons for tree planting (Table 2). Environmental benefits dominate, though there is some interest in timber production and developing an asset and a legacy for children. The rankings are remarkably consistent in the two studies. One difference (found statistically significant through ANOVA) is the higher priority on windbreaks in the more elevated areas (i.e. other than the Johnstone shire). In that the dominant reasons for tree planting are not financial in nature, economies of plantation size do not appear to be a major concern.

Landholder Typology Study in Relation to North Queensland Survey (Cluster Analysis)

Emtage *et al.* (2001) reported an application of hierarchical cluster analysis to the north Queensland survey results, designed to identify distinct groups of landholders in terms of inclination to plant trees. The characteristics of the groups identified are summarised in Table 3. A focus group discussion with north Queensland farm forestry extension officers was undertaken to 'help name the five groups identified by cluster analysis of survey responses' (Emtage *et al.* 2001). The resulting group descriptions are presented in Table 4.

Table 2. Rating of reasons for tree planting, Obi Obi Valley in south-east Queensland 1994 and three shires in North Queensland 1998

Reason for planting trees	Location				
	Obi Obi Valley	Johnstone shire	Atherton shire	Eacham shire	All three NQ shires
To protect or restore land	4.6	3.9	3.9	4.2	4.0
To attract wildlife and birds	4.5	3.5	3.7	3.8	3.6
Personal interest in trees	4.4	3.3	3.4	3.7	3.4
To protect the local watershed	4.1	3.8	4.0	4.2	4.0
To improve the look of the property	4.1	3.2	3.5	3.6	3.3
To increase the value of the farm	na	3.1	3.2	3.2	3.2
Legacy for children or grandchildren	na	3.3	2.7	3.2	3.1
To create windbreaks	3.9	2.8	3.4	3.4	3.1
To make money in the future	2.3	2.9	2.5	2.4	2.7
To diversify farm business	2.1	2.6	2.2	2.2	2.4
Superannuation or retirement fund	na	2.3	2.1	2.1	2.2
To provide fence posts	1.6	1.5	1.8	1.4	1.5

na: not asked in this survey.

Table 3. Landholder typology derived from north Queensland landholder survey

Group	Mean time managed property (yrs)	Mean property size (ha)	Cropping (% of holding)	Mean fraction of income from property (%)	Proportion who planted more than 30 trees %)
1	16.5	58	47	45	34
2	14.5	54	16	36	55
3	18.4	81	37	54	45
4	27.0	100	45	71	21
5	21.5	74	38	62	29

As revealed by Tables 3 and 4, landholders in groups 2 and 3 have a relatively high propensity to plant trees, while those in groups 4 and 5 have a low propensity. With the exception of group 3, the ranking of proportion planting trees is in reverse order to mean property size. Notably, the commercial farmers have relatively low interest in growing trees.

Table 4. Landholder group names given by extension personnel and main influences affecting tree planting behaviour

Group	Influences on planting behaviour
1. High intensity farmers	Have some personal interest in trees but also a strong commercial focus. Limited capital and property size leads to risk aversion. Enjoy agricultural pursuits.
2. Retired professionals and hobby farmers	Strong personal interest in tree growing and lower reliance on landholding for income leads to high participation in farm forestry.
3. Progressive second generation farmers	Strong interest in tree growing but have high reliance on landholding for income and low ability to cope with demands of planting and management.
4. Traditional	Low personal interest in tree growing. High reliance on land for income. Enjoy agricultural production. Interest in managing native forests.
5. Experienced/comfortable	Moderate personal interest in tree growing and reliance on land for income. Low labour input relative to income produced.

Source: Emtage *et al.* (2001).

Neural Network Analysis of North Queensland Data

The north Queensland dataset was re-analysed using VISCOVERY SOMINE³. The preliminary results of this analysis have been reported in Herbohn *et al.* 2003. There were two reasons for re-examining these data. Firstly, the dataset has a large number of missing values that effectively reduce the number of responses that can be analysed in k-means cluster analysis from 223 to 109. When using SOMINE, it is not necessary to discard subjects for which values of some variables are missing. Secondly, k-means cluster analysis forces objects into a specified number of clusters, even when the 'true' number of clusters is unknown. SOMINE does not require the number of clusters to be pre-specified, allowing parameter-free clustering, data association and pattern recognition using all the variables in the data set. The SOMINE analysis of the data identified three clusters, as summarised in Table 5. In this analysis the negative relationship between farm size and the amount of planting is clear, with about 60% of 'hobby farmers (average farm size 58 ha) planting compared with 27% and 16% for the two other types of farmers with much higher average farm sizes (112 and 102 ha, respectively).

³ SOMINE is a self-organising map (SOM) based on the Kohonen algorithm, an artificial neural network (ANN) that is derived from current understandings of biological nervous systems (Lippmann 1987, Eudaptics Software 1999).

Table 5. Comparison of cluster variables

Cluster variable	Cluster 1: progressive farmer	Cluster 2: hobby farmer	Cluster 3: traditional established farmer
Farm size (ha)	112 ^a	58	102 ^a
High economic value land (%)	48 ^a	8	47 ^a
Medium economic value land (%)	26 ^a	52	36 ^a
Low economic value land (%)	15 ^a	38	9 ^a
Satisfied with current land use ^b	3.7 ^a	2.3	4.1 ^a
Income earned on-farm (%)	68 ^a	17	69 ^a
Average education	High school	Tertiary	Primary or high school
Age	Higher than average proportion of 35-50 years	Higher than average proportion of 51-65 years	Higher than average proportion of over 65s
Percentage who have planted trees	27	60	16

a. These means do not differ at the 5% significance level.

b. 1 = not satisfied, through to 5 = very satisfied.

Source: Herbohn *et al.* (2003).

Survey of Mayors in 14 Local Government Areas in North Queensland

Eono and Harrison (1997) examined the views of mayors in the 14 local government areas participating in the Community Rainforest Reforestation Program (CRRP) in north Queensland. This program, extensively reviewed in Erskine *et al.* (2005), involved the three levels of government (federal, state and 14 local governments) in planting of almost exclusively native rainforest and eucalypt tree species on private land. The main planting activity was during 1992-96, when about 1,600 ha of plantations were established, with more than 500 landholders participating in the program (Creighton and Sexton 1996). As indicated in Table 6, the mayors regarded the program as potentially replacing the timber resource lost due to World Heritage listing of the Wet Tropics rainforests, creating employment for their constituents and providing tourism benefits. Environmental benefits were ranked lower. That is, local governments viewed this program as a timber production and job creation program, even though the areas planted per property were low, and the program did not rely on commercial farms and full-time farmers.

Survey on Potential Applicants for Plantation Joint Ventures

Harrison *et al.* (1999) reported a survey of landholder attitudes to the Queensland government plantation joint venture scheme (PJVS). This scheme allows either partner – the landholder and state forest agency (Department of Primary Industries – Forestry) to hold up to 80% of the equity in the plantation project. Input and equity

sharing arrangement are flexible, in that the landholder has the option to carry out pruning and thinning or make payment for contractor operations, and hence gain the equity, or have DPI Forestry pay for activities. Questionnaires were mailed to 95 landholders who had responded to an invitation to submit an expression of interest in the scheme, and 57 responded. Most were sole owners or partners, although 15% were companies; 37.5% had operated their properties for less than five years, and 82.5% for less than 10 years. Just over 40% of properties were less than 40 ha in area; 23% were involved in crops or dairying, the majority being engaged in extensive grazing. Only 26% of respondents described themselves as farmers, compared with 47% in trades or professions; 35% reported taxable incomes of over \$50,000 a year.

Table 6. Rankings of potential benefits of the CRRP by LGAs

Category of benefits	Number of times mentioned	Mean ranking
Sustainable supply of timber for future generations	10	3.20
Increased employment prospects in the shire	9	3.44
Community cohesion through employment scheme	5	4.40
Ecotourism	4	4.40
Establishment of other businesses associated with timber	6	4.50
Improvement in water quality in streams	5	5.00
Increased community awareness of environmental issues	8	5.12
Increased land values and landholders' bank credit ratings	4	5.50
Decreasing the greenhouse effect	2	5.50
Education of landholders in forestry	8	6.12
Improvement of soil	4	6.30
Establishment of tree nurseries	6	6.80
Decreased stream pollution and sedimentation costs	3	7.00
Increased revenue from fish catch	2	7.00
Research benefits of the program	8	7.12
Decrease in future timber imports	9	7.55
Potential emergence of small timber-using businesses	7	8.14
Increased biodiversity	3	9.30

Source: Eono and Harrison (1997).

Landholders were asked 'What do you see as the main strengths of the Plantation Joint Venture Scheme?', and invited to list up to five items in order of importance. The most frequently cited item was provision of technical expertise in growing trees by DPI Forestry, followed by the opportunity to generate financial returns then the input of capital by the state forest agency as joint venture partner (Table 7). Surprisingly, the flexibility of the joint venture contract under which landholders can elect how much of the expenditure they wish to finance was not highly ranked, nor was the marketing capability of DPI Forestry; it is possible that these will be accorded greater recognition as plantations mature.

Table 7. Perceived strengths of the Plantation Joint Venture Scheme

Feature of scheme	Number of times ranked:		
	First	In first three	In list of five
DPI Forestry silviculture expertise	12	21	24
Financial returns	7	14	24
DPI Forestry capital input	8	12	15
Landscape amenity	2	3	15
Conservation benefits	3	4	11
Land rehabilitation	3	5	9
Enterprise diversification	1	5	9
Product marketing	1	4	6
Contract flexibility	0	2	4
Supply of labour	0	0	2

Source: Harrison *et al.* (1999).

Evaluation of Performance of the Community Rainforest Reforestation Program

Harrison *et al.* (2004) reported an interview survey of CRRP participants in the Atherton and Eacham shires, designed to assess the performance of the program. In 2000-01, 72 of the 146 landholders in these two shires were interviewed, and at least one CRRP plot was inspected on each property. Property sizes were found to average about 75 ha, but with nearly half falling in the 0 – 50 ha category and with 16% having an area of less than 10 ha. About 34% had planted less than 3 ha of trees, and 24% between 3 and 10 ha; the median area planted was 3.5 ha, and the mean 6.05 ha.

Although one of the initial objectives of the CRRP was to generate a timber resource to replace that lost by the World Heritage listing of the Wet Tropics of Queensland (CRRP Management Committee 1993), a view had been formed that the program would lead to little timber production. However, about one quarter of respondents in this survey ranked timber production as the primary motivation behind the decision to participate in the program, and another 20% ranked this as a moderately important factor. Other important motivations were creek bank stabilisation (the primary reason for 20% of respondents), land ‘rehabilitation and conservation’ (10%), landscape aesthetics, provision of shade and shelter, and creation of windbreaks.

Just over 50% of respondents stated an intention to manage their plantings to optimise multiple benefits, including timber production. About 10% intended to manage their plantings solely for one of the objectives of timber production, soil and water management or conservation. Approximately 15% did not intend to have any active role in managing their plantings. In terms of area rather than number of landholders, timber production as a dominant use accounts for about 24% of the area planted; those planting for timber planted larger areas than those planting for other reasons. On average, landholders expected to harvest about 70% of their CRRP area; 36% did not intend to harvest any of their CRRP trees, while 47% intended to harvest all of their CRRP trees.

The RIRDC Eastern Queensland Case Studies

Maczkowiack *et al.* (in press) reported findings of 22 case studies of farm forestry throughout eastern Queensland, with data collected through personal interview and site inspections. The terms of reference of the funding body (the Rural Industries Research and Development Corporation, RIRDC) confined the case study to landholders who had actually established tree plantations, and these were located by purposive sampling.

The tree planters could be characterised as well educated, relatively old, with relatively high incomes (particularly from off-farm including professional sources). A notable finding was the strong environmental objectives in planting, and low reported priority on timber production. Motivations for planting included establishing real estate or a legacy for heirs and successors, choosing a land use which is 'easy to manage', carrying out an environmentally responsible form of land use, and personal interest in growing trees. In general the respondents did not feel a need to justify the project on financial grounds, and frequently the age at which trees would be ready for harvest would be beyond their expected lifetime, which may have been a reason for the focus on short-term benefits. Maczkowiack *et al.* (in press) noted that the majority of case study landholders clearly fell within the category of 'hobby farmers' or 'lifestyle seekers' as identified by Herbohn *et al.* (2003), with a much lower average farm size than other farmer types within the rural community. This is probably related to a combination of these landholders lacking the desire or capacity to manage larger blocks, capital constraints and the additional benefits that a larger block would provide to their intended use (e.g. rural lifestyle) not outweighing the additional costs.

Concerning the land on which tree planting took place, most of the properties were non-viable as farms, but appealing to investors for other reasons, e.g. due to proximity to recreational areas or centres of employment or where it is likely that a real estate boom will occur. Often the trees were planted on poor soils. The case studies also revealed, in relation to planting of cabinetwood timbers, the substantial investment in plantation establishment (up to about \$20,000/ha), and an irrepressible optimism of respondents about high tree growth rates and high timber prices.

The North Queensland MODSS Study

Jeffreys (in preparation) developed a multi-objective decision-support system for forestry on the Atherton Tablelands of north Queensland. The research method, reported in Jeffreys (2003), involved eliciting community goals and objectives and expert opinion, in relation to forestry options. Stakeholders and experts were interviewed individually, using a semi-structured questionnaire. The stakeholder and some key experts also attended the stakeholder workshop, designed to consolidate and add to the information gathered in the interviews. Forestry options were considered at three time scales, namely the establishment period, transitional period (plantation age five to 30 years), and the steady-state period.

The stakeholders defined 16 options for farm forestry development, each including a forestry management practice and a financial structure, with most landholder financed. Most options involved commercial-scale or medium-sized plantations, the latter being defined as at least 10 ha in area. The options were compared on the basis of 19 evaluation criteria, covering economic, social and environmental issues. The highest ranked option across all time periods was private

medium-sized plantations, which scored relatively high on the three criteria groups. The implications for farm fragmentation are somewhat unclear. Medium-scale rather than commercial-scale plantings appear to be favoured and more compatible with regional land-use goals. This is useful planning information, but actual landholder decisions may be for smaller plantings, particularly in the face of subdivision of properties moving out of dairying.

DISCUSSION

A consistent picture has emerged from the studies reviewed, that tree planting is not dependant on existence of large and commercially viable farms, and that in fact most planting – in terms of numbers of plots and probably also area planted – takes place on smaller holdings⁴. This may be conceptualised as ‘real farmers don’t grow trees’⁵ or, viewed from another perspective, ‘real tree growers are not farmers’. On the basis of this evidence, there should be little concern that land parcelisation and fragmentation will reduce the extent of reforestation on private land.

Whether increased planting by small farmers means that there will be an increase in timber turnoff is another question. Survey evidence suggests that landholders who plant trees do so primarily for environmental reasons rather than to generate income from timber sales, and to date little of the farm-grown native hardwood timber has been marketed. Even though landholders espouse environmental objectives and do not have well formed harvest intentions, the apparent negative implications for timber production on farms may be deceptive, for several reasons:

1. The tree species being grown by private landholders are predominantly those which have been used in the past for furniture production, i.e. the native rainforest cabinetwood species with highly impressive timber in terms of colour, grain and workability. There appears to be a high level of enthusiasm amongst landholders about the well-known outstanding timber properties of rainforest cabinet tree species, and a belief that if these can be grown successfully then very high timber prices may be obtained.
2. Since growing rainforest cabinet species on farms is a relatively new activity, landholders may be adopting a ‘wait and see’ attitude about whether saleable timber will be produced. This explanation is supported by the choice of tree species with high timber value, suggesting that respondents wish to keep the timber production option open.
3. There may be an element of ‘environmental correctness’ in survey information, where respondents do not wish to be seen as ‘rednecks’ at a time when there are strong anti-logging protests and environmental campaigns.

⁴ This is consistent with findings in similar farming areas in northern New South Wales (Emtage 1995, Specht and Emtage 1998).

⁵ As noted by an anonymous reviewer of this paper, such a comment is stereotypical, and in fact smallholders ‘tender their land to the betterment of other than timber forest products’.

4. Environmental reasons for planting may be reported as a way of rationalising expenditure on plantation establishment, because these benefits will commence almost immediately whereas timber benefits will be 20 to 50 or more years off, depending on the species planted. Such rationalisation for expenditure could be forthcoming where the landholder faces criticism from neighbours, or even family members, for tree planting.

In other words, the 'established certainties' about failure of farm forestry to contribute to timber supply may not hold in the future. The reasonably successful promotion of plantation joint ventures in south-east Queensland suggests that 'small farmers' are interested in growing trees for timber. Particularly in high rainfall areas close to the east coast, some areas of traditionally farming land are regaining the high tree cover which was present before farming (particularly dairying) established. This reversion to a tree-covered landscape means that a large timber resource is being established, if in a haphazard and unplanned way. The species being grown are not the fast growing exotic conifers favoured by the state forest agency, or the eucalypts being planted by the newly emerging industrial foresters, but rather are native hardwoods previously harvested from state forests and remnant forest on private land. Even in small volumes, they could support specialty furniture production enterprises.

Subtle changes in community attitudes to forests are also taking place. The well-attended annual 'Chainsaw to Fine Furniture' exposition at Maleny in south-east Queensland reveals a growing interest in using native rainforest timbers to produce solid-wood furniture with attractive colour and grain. Further evidence of this trend arises in the findings of Harrison *et al.* (2004) that the CRRP participants with larger plantings carry out more intensive silvicultural management and have a stronger interest in timber production.

If, as seems probable, coastal south-east Queensland becomes a very large urban area in the future, there will be a need to maintain green spaces. Relative to agriculture or horticulture, forestry is a desirable land use in these areas, having low agrochemical input and high watershed protection benefits. However, if these areas have no timber production, they will be costly to support. Few local governments provide rate remissions for tree planting. Recent spectacular increases in official land valuations, have led to increased local government rate bills, and it is anticipated that more landholders will be caught in the State government land tax net. The increased holding cost of land will lead to land disposal and subdivision where local government regulations make this possible. Small-scale forestry for timber production and for non-timber forest products (e.g. medicinal plants, bee keeping, crafts) has the potential to become an important land use in these areas, providing the regulatory environment is supportive.

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